Work Group 3
Situational Awareness

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Work Group 3 Situational Awareness

- Background
  - Unique Assumptions
    - SA applies to humans, machines or combinations thereof
    - Standardized Situational Awareness (SA) definition
      - Perception
      - Comprehension
      - Projection

Workgroup 3 Issues

1. Definition of SA.
2. Develop personnel qualification standards for operators in order to provide SA design guidance.
3. Lack of validated or reliable generic SA assessment tools.
4. Definition/description of SA Taxonomy.
5. SA functional area SMEs shall remain the same throughout this process of developing design guidance.
6. Testing must emulate environment.
7. Advanced Technology.
8. Need to incorporate SA principles into human reliability models (i.e., human error).

Issue #1
Situational Awareness Definition

- Rationale for Selecting Issue
  - **There is no formal definition of Situational Awareness (SA) within the System Safety community.**
  - Issue Severity = Medium

Situational Awareness Definition Issue #1

- Recommended Issue Resolution
  - Work Group 3 Proposes SA Definition
    - Adopt Endsley's 1988 Definition of Situational Awareness:
      - "The perception of the elements in the environment within a volume of time and space, the comprehension of their meaning and the projection of their status in the near future."
        - » Level 1: Perception of the environment, and system specific feedback.
        - » Level 2: Comprehension is the integration of the perception with long-term and short-term memory to understand the current situation.
        - » Level 3: Projection of the current situation into the near future and determination of the action to be taken.

Situational Awareness Definition Issue #1

- Proposed completion date – Complete; Definition has been forwarded to Precepts/TLM work group for inclusion in definitions.

Develop Personnel Qualification Standards for Unmanned Systems Operators

Issue #2

- Rationale for Selecting Issue
  - Adequate training standards may not exist; it would be difficult to know what level of rigor to apply to the SA design guidance. Personnel Qualification Standards (PQS) form one of the fundamental basis for SA design goals and objectives.
  - Issue Severity = High

Develop Personnel Qualification Standards for Unmanned Systems Operators

Issue #2

- Recommended Issue Resolution
  - Training and implementation of HSI in accordance with the appropriate DOD 5000.2 series. System developer should provide a written unmanned system safety policy. Policy should state by name which personnel are authorized to work with the unmanned systems.

Lack of Validated or Reliable Generic SA Assessment Tools

Issue #3

- Rationale for Selecting Issue
  - Tools presently exist for a single human user, however, such tools do not exist for human teams, machines, and/or combinations.
  - Issue Severity = High

Lack of Validated or Reliable Generic SA Assessment Tools Issue #3

- Recommended Issue Resolution
  - Develop and validate reliable SA assessment tools.

Definition/Description of SA Taxonomy
Issue #4

- Rationale for Selecting Issue
  - SA cannot be adequately addressed without SA constructs based upon system taxonomy.
  - Issue Severity = High

Definition/Description of SA Taxonomy

Issue #4

- Recommended Issue Resolution
  - Develop system based taxonomy:
    - Machine to Machine
    - Machine to Man
    - Etc.
  - Future SA groups structure study/development of safety criteria in focus areas.

Definition/Description of SA Taxonomy
Issue #4

- Group Structure:
  - System Safety Engineer
  - Design Engineer
  - Operators
  - Human Factors Engineer
  - System Engineer
  - Program Management

Definition/Description of SA Taxonomy
Issue #4

- Focus areas:
  - Communications
  - Weapons
  - Guidance and Control
  - Software
  - Power
  - Systems Integration
  - HSI

SA functional area SMEs shall remain the same throughout this process

Issue #5

- Rationale for Selecting Issue
  - Work group membership consistency throughout the safety design criteria development.
  - Issue Severity = Medium

SA functional area SMEs shall remain the same throughout this process

Issue #5

- Recommended Issue Resolution
  - SME personnel remain the same or consistent throughout the safety design criteria development.

Testing Must Emulate Environment
Issue #6

- Rationale for Selecting Issue
  - SA is highly sensitive to the operational environment. Current-testing procedures may not adequately emulate system operational environments and anticipated environmental stimuli.
  - Issue Severity = Medium

Testing Must Emulate Environment

Issue #6

- Recommended Issue Resolution
  - Testing must emulate actual anticipated operational environments and stressors or environmental stimuli. The evaluation of SA functionality should be conducted in the anticipated environment under realistic scenarios.

Advanced Technology
Issue #7

- Rationale for Selecting Issue
  - Advanced Technology Programs should participate in future Unmanned System Safety SA workshops.
  - Issue Severity = Medium

Advanced Technology
Issue #7

- Recommended Issue Resolution
  - Future Unmanned System Safety SA Workshops should further focus on advanced technology systems.

Incorporate SA Principles into Human Reliability Models

Issue #8

- Rationale for Selecting Issue
  - SA principles may not be incorporated into human reliability models.
  - A System Safety Program (SSP) can relate improved SA to reduction in human error and improve the ability to implement SA design guidance by incorporating SA principles into human reliability models.
  - Issue Severity = Medium

Incorporate SA Principles into Human Reliability Models

Issue #8

- Recommended Issue Resolution
  - Incorporate SA definition into human error calculations.